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ABSTRACT

The combinations of factors that enhance or interfere with early grade-school performance were investigated among black children from Head Start eligible families who were participants in the ETS Longitudinal Study of Young Children and Their First School Experiences. The children selected for this study's subsample were significantly above or below the average performance for children of similar ethnic or income status on third grade reading and math tests, or they were significantly deviant from the level predicted by their performance on a test of preacademic skills at age 4. A major conclusion from the data was that family and child variables are not necessarily associated with exceptionally high or low academic achievement. Intensive study of children with the greatest absolute deviation in cognitive-perceptual performance found that the most common picture for children with the greatest achievement gains was a continuing warm and stimulating classroom environment combined with a home environment that provided emotional support in general and support for school activities in particular. Conversely, lack of home and/or school support decreased achievement. Overall, the data show that it is not a particular parent, teacher, or child attribute, attitude, or behavior, or a particular social setting that is important, but the cumulative effects of their multiple interactions, and that different clusters of variables appear to be differentially effective for different children. (CMG)

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SCHOOLS CAN AND DO MAKE A DIFFERENCE: FINDINGS FROM THE ETS LONGITUDINAL STUDY OF YOUNG CHILDREN AND THEIR FIRST SCHOOL EXPERIENCES

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Introduction

The ETS Longitudinal Study of Young Children and Their First School Experiences focuses on two basic questions: What are the components of early education that facilitate or interfere with the cognitive, personal, and social development of disadvantaged children? What are the environmental and background variables that moderate these effects, and how do these moderators produce their influence?

It is well established that children from low-socioeconomic-status families generally do not achieve academically as well as middle-class children. While a number of researchers have related this finding to various aspects of the differing environments of lower- and middle-class children, there is considerably less evidence describing environmental factors associated with performance differences solely within an economically disadvantaged population. Data about third-grade children from the longitudinal study indeed confirm the existence of wide ranges in cognitive aptitude and academic achievement among children of relatively homogeneous socioeconomic status. To further our understanding of development and contribute to planning environments to facilitate that development, it is critically important to discover the unique characteristics of children and their environments that do not fit the generalization that low social class equals low achievement.

ED023362

This is an abridged version of Project Report 76-21, Notable Early Characteristics of High and Low Achieving Black Low-SES Children, authored by Virginia C. Shipman, which was prepared for the Office of Child Development, Department of Health, Education, and Welfare, under Grant H-8256.

Analysis to date of the massive amount of data collected has been focused on examining relationships among various large sets of information from particular domains. In these investigations an attempt has been made to examine the consistency of findings across several status categories (that is, child's sex and race, family socioeconomic status, and geographical location). But one of the frustrations experienced in doing large-scale research is the impersonal aspect of such group analysis and the consequent decreased awareness one has of individual study participants. Every so often one hears a tester's or teacher's salient comment about a particular child; in some instances a local agency or newspaper article reports a critical family event. But to a large extent the individual developmental histories of study children remain unknown to the researcher who, to operate efficiently and in accord with relevant statistical models, must constantly reduce the data collected to a limited set of variables.

Given the multiple and interacting nature of influences upon any behavior and the error contained in any measurement technique used, the magnitude of correlation obtained between psychosocial variables and a young child's functioning is understandably moderate at best, accounting for only a small amount of the behavior examined. Moreover, we do not know the extent to which various aspects of the child's development are appropriately assessed by statistical models that assume a linear growth model. The present study was an attempt to generate hypotheses concerning those combinations of factors that enhance or interfere with children's early grade-school performance. Intensive case studies were prepared for those study children who, on a third-grade achievement test, were (a) significantly above or below the average performance for children of similar ethnic and income status in the basic school skills of reading and math or (b) significantly deviant from the level predicted by their performance on a test of preacademic skills at age 4.

It should be noted that such an approach is not seen as an alternative or substitute for previous analyses, but rather as a supplement to them. We recognize that the problems indicated above are not eliminated by this approach. However, an intensive study of extreme cases should serve to highlight significant factors and/or combinations and sequences of factors, that is, those environmental events or personal dispositions that covary with school performance. Thus, close examination of the preschool and primary grade programmatic

information gathered should help delineate critical factors in the child's early school experiences. Those factors or processes not identified previously in the larger sample can then serve as hypotheses to be tested in subsequent experimental studies. Thus, by multiple analytic strategies we hope to contribute to the further understanding of the complex interacting influences upon children's development so as to provide a basis for informed socioeducational intervention.

Sample

The sample for the current report is a subsample from the ETS Head Start longitudinal study. Sample selection procedures and initial sample characteristics for the longitudinal study are presented in Project Report 71-19 (Shipman, 1971). Briefly, in the fall of 1968 four regionally distinct communities were selected that (a) had sufficient numbers of children in grade school and in the Head Start program, (b) appeared feasible for longitudinal study, given expressed community and school cooperation and expected mobility rates, and (c) offered variation in preschool and primary grade experiences. The study sites chosen were Lee County, Alabama; Portland, Oregon; St. Louis, Missouri; and Trenton, New Jersey. Within these communities, elementary school districts with a substantial proportion of the population eligible for Head Start were selected. In each school district an attempt was made to test all nonhandicapped, English-speaking children who were expected to enroll in first grade in the fall of 1971 (that is, children of approximately 3½ to 4½ years of age).

In 1969 mothers were interviewed and children were tested prior to their enrollment in Head Start or any other preschool program. For this initial four-site sample, at least partial data were obtained on a total of 1,875 children, with Lee County and Portland constituting 60 percent of the sample. Sixty-two percent of the sample was Black, with boys comprising 53 percent of the overall sample, 54.5 percent of the Black sample, and 50.5 percent of the White sample. For the three sites in which children had the opportunity to attend Head Start in the second year of the study (1969-70), 37.2 percent of the sample attended Head Start, 11 percent attended other preschool programs, and 51.8 percent had no known attendance in Head Start or other preschool programs. In Lee County, where

Head Start was a kindergarten program, 41.7 percent of the initial sample attended Head Start, 19.1 percent attended other preschool programs, and 39.9 percent had no known attendance in Head Start or other preschool programs. While racial composition of the Head Start sample varied by site, substantially more Blacks than Whites attended Head Start; only 13.3 percent of the children enrolled were White. For a variety of reasons, the St. Louis site was dropped in the third year of the study, and the 353 subjects there were lost from further longitudinal study. In June 1974, the six-year longitudinal sample contained 1,017 children in *three* sites. Thus, except for the loss of St. Louis, attrition over six years was limited to about one-third of the original sample, with losses distributed equally across sexes and sites, but relatively greater for Whites in each site. The six-year longitudinal sample went from 62 percent to 72 percent Black across sites.

The current analysis focused on children from the longitudinal sample (that is, those who were tested or whose mothers were interviewed in Year 1[1]) who were below the 1969 Office of Economic Opportunity poverty guidelines, as determined by the parent interview given during the year Head Start was available to study children. Since the number of White families in the study meeting these criteria was relatively small, only Black children were included to eliminate the possibility of racial confounding. Scores on the Year 6 Cooperative Primary Tests were necessary to define the extreme groups, which markedly reduced the size of the sample available for this analysis since achievement tests were administered only in target classrooms (that is, classes with 50 percent or more study children who had been previously tested). Thus, the sample for the current report (henceforth referred to as the total sample) consisted of Black children from Head Start eligible families who were identified in Year 1 and had scores available on the Year 6 Cooperative Primary Tests. The total sample consisted of 100 boys and 86 girls. From this economically disadvantaged sample, the highest and lowest achieving children were selected by three different methods, which will be discussed below. Although most children were identified by all three

[1]Throughout the report "Year" refers to year of the longitudinal study. Year 1 = January to August 1969 (child age 3½-4½); Year 2 = September 1969 to August 1970 (child age 4½-5½); Year 3 = September 1970 to August 1971 (child age 5½-6½); Year 4 = September 1971 to August 1972 (child age 6½-7½); Year 5 = September 1972 to August 1973 (child age 7½-8½); Year 6 = September 1973 to August 1974 (child age 8½-9½).

methods, some children satisfied the selection criteria for only one method.

The third-grade reading and math subtests of the Cooperative Primary Tests (Cooperative Test Division, ETS, 1967) served as the index of Year 6 achievement. The Cooperative Primary Tests are a nationally standardized achievement test battery developed by ETS and designed for use in grades 1 through 3. The tests are group administered, with the children responding by making an "X" on the one of the three response alternatives they believe is correct. There is no special instruction to the students about guessing, and there is no correction for guessing in the scoring. The teacher is instructed to allow a reasonable amount of time for all students to finish. To provide practice with this type of item, the pilot test included in the test package was administered first. Both forms of the reading test consist of 50 items, some of which assess the comprehension of individual words, while others require the students to extract a key element from a sentence or paragraph or provide some interpretation, evaluation, or inference based on the sentence or paragraph. The math test consists of 60 items covering the following topics: number, symbolism, operation, function and relation, approximation, proof, measurement, estimation, and geometry. Straight computation is not emphasized, but rather an attempt is made ". . . to test major concepts of mathematics in their emergent state" (Cooperative Test Division, ETS, 1967). Form 23B of both reading and math was administered.

The first method selected children for the extreme groups on the basis of their raw scores in reading and math. The 25 highest and 25 lowest scoring Black Head-Start-eligible children, irrespective of sex, were identified separately for the two subtests. Each of the resultant groups thus contained approximately 14 percent of the total sample, and the means of the high and low groups were more than two standard deviations apart. Within this group the 10 highest and lowest scoring boys and 10 highest and lowest scoring girls were then identified. Table 1 presents the means and standard deviations on reading and math for the total Black Head-Start-eligible longitudinal sample and for groups identified by this method. These values can be compared to the national standardization sample for the Cooperative Primary Tests where the reading mean was 36.1 with a standard deviation of 8.6 and the math mean was 39.4 with a standard deviation of 9.0.

Table 1

Means and Standard Deviations on Reading and Math for the Total Sample and Extreme Raw Score Groups

Group	n	M	SD
Reading			
Total Sample	174	25.16	8.32
High Combined Sexes	25	39.36	2.87
Low Combined Sexes	25	13.80	1.83
High Boys	10	39.10	2.77
Low Boys	10	12.80	1.32
High Girls	10	41.30	1.89
Low Girls	10	14.00	2.11
Math			
Total Sample	181	28.50	8.43
High Combined Sexes	25	42.80	3.21
Low Combined Sexes	25	16.68	2.81
High Boys	10	44.30	3.61
Low Boys	10	15.70	2.71
High Girls	10	42.90	2.38
Low Girls	10	16.60	3.17

The second method selected Black Head-Start-eligible children whose performance was significantly better or worse than predicted from Year 1 scores on the Preschool Inventory (PSI) (Cooperative Tests and Services, ETS, 1970). The 64-item PSI was selected as the predictor because it is a highly reliable test of preschool achievement and had the highest loading on the general information-processing factor defined in Year 1 (Shipman, 1971). Since age at time of testing was known to affect PSI scores, the scores were age-adjusted by regressing total scores on age at the date of testing. The age-corrected PSI scores were then used in standard least-squares regression equations to obtain a predicted score for each child in reading and math. Separate regression equations were used for boys and girls. For boys the correlation between Year 1 PSI and Year 6 reading scores was .36 (regression weight [b] = .29), while for girls the correlation was .45 (b = .39). The correlations between PSI and math performance were .25 (b = .23) for boys and .35 (b = .29) for girls. Separately for read-

ing and math, the difference between the actual and predicted scores for each child was computed, and for each subtest the 10 boys and 10 girls with the greatest positive difference scores were selected; similarly, the 10 boys and 10 girls with the greatest negative difference scores were identified. Due to regression to the mean, the highest and lowest predicted scores were substantially closer to the mean than the highest and lowest actual scores. Thus, most of the children selected by this deviation-from-prediction method also were selected by the first absolute-score method.

To avoid apparent mislabeling for some children caused by the regression-to-the-mean effects of this second method, a third method was used that identified children whose initial PSI scores were one standard deviation above or below the average of the total sample and whose Year 6 reading and math scores were one standard deviation below or above the mean. Thus, these were the children showing the greatest change in achievement performance. Since the mean PSI score was 23.25 with a standard deviation of 9.89, any child with a score of 13 or less was considered low on the PSI and any child with a score of 33 or more was considered high. By this criterion 15 boys and 7 girls, or about 12 percent of the sample, were defined as low while 10 boys and 15 girls (about 15 percent of the sample) were classified as high. The mean of the reading scores was 25.16 with a standard deviation of 8.32; thus scores of 33 and above were considered high, while scores of 17 and below were considered low. For the math scores (mean of 28.5 and standard deviation of 8.43), high scores were those of 37 and above, while low scores were 20 and below. The deviation sample resulting from this method of selection comprised those children in the low-high and high-low categories for each subject area. The 10 children in this group—4 in reading, 5 in math, and 1 who was included in both the reading and math areas—were chosen for particulary intensive case study.

Data collection and processing procedures

General strategies

To achieve the broad goals of the study, the measurement strategy required selection of a variety of measures that would help describe more adequately the complex interrelationships and structure of

children's abilities and characteristics over time and permit determination of their interaction effects with particular preschool and primary grade programs. Measures encompassing objectives claimed by preschool and primary-grade programs were included, along with measures of development that social science holds as important for human functioning. Measures also were included that would help delineate basic cognitive, affective, and social processes and their courses of development. Tasks were selected to allow continuity of measurement across age periods, through the use of vertically equivalent forms over time, and multiple measurement of the same variable (within a context) across several age periods so that possible developmental shifts in expression could be monitored. Process rather than static variables were emphasized, especially process variables involving parent-child and teacher-child interactions, such as modes of information-processing and reinforcement strategies. To the extent possible, measures were included that tapped functional characteristics or perceptual and cognitive styles affecting learning, such as individual differences in ways in which children approach a task, kinds of cues selected, strategies of organization, speed of decision and response, and persistence. Implicit throughout was the belief that only for the intermediate purpose of structural analysis and derivation of measures within domains could one separate cognitive, perceptual, social, and affective domains or study the children without taking environment into account.

The six years of research with the longitudinal study sample included a total of about 25½ hours of testing for each child, 4½ hours of interviews with each of their mothers, 1½ hours of observing each mother-child pair working together on tasks, and a physical examination of each child. In addition, 18 days were spent observing each Head Start class, 3 days observing kindergarten, first-, second-, and third-grade classes, and two half-hour periods watching each child during "free play" in preschool. About 4 hours of each Head Start, kindergarten, first-, second-, and third-grade teacher's time was taken to supply information about herself and the children in her classes, an hour for each Head Start aide, more than an hour of each Head Start center director's and principal's time to describe the preschool centers and elementary schools in general, and many consultations with community agencies to obtain information about the environments in which the children lived.

The major variables toward which these information-gathering

efforts were directed include: (1) *the family*, both status and process variables, that is, those variables describing what the family is (for example, ethnic membership, occupational level) and what it does (for example, the mother's teaching styles with her child and her attitudes toward the schools and the learning process); (2) *the teacher*, including such things as background characteristics, attitudes, abilities, teaching goals; (3) *the classroom*, both program components and teacher-child and peer relationships; (4) *the school*, physical characteristics and organization as well as relationships between teachers and administrative staff; and (5) *the community*. The largest percentage of measures included, however, were those designed to tap several aspects of (6) *the child*, for example, health information and cognitive, perceptual-motor, affective, and social development.

Data collection procedures

Community support and participation were essential if useful data were to be obtained. Community leaders and administrators were consulted, and written intents (not merely consents) to participate in the study were sent to ETS by both community agencies and local school boards. Field operations were organized around local staff who served as coordinators, interviewers, testers, and observers. For the first phase of data collection, household canvassing, and parent interviews, ETS subcontracted with the New York City firm of Audits and Surveys to locate eligible children and then complete a 90-minute ETS-prepared interview with each eligible child's mother or mother surrogate. The interviewers, all female and matched by race with respondents, were recruited from the local communities, with the staff of Audits and Surveys responsible for both training and supervision. In subsequent years of the study, parent interviews were conducted in a similar manner, except that ETS assumed the training and supervision responsibilities that had been subcontracted to Audits and Surveys. During a child's Head Start year, the mother was interviewed in the testing center; home interviews were again obtained when the child was 9 years old.

During the first study year, individual child tests and mother-child interaction tasks were administered by local women, most of whom were Black housewives with limited work experience. While the usual educational credentials were not required, experience in

working with young children was considered highly desirable, as was the ability to read well and speak with ease. After four to five weeks of training, final selection of testers was made by the project director and a senior member of the research team. Testing was monitored by the local coordinator and by ETS regional and Princeton office staffs. Training procedures were essentially identical in later years except that, with increased experience, the training period could be reduced to three weeks. In the early years of the study, test centers were located in churches or community recreation facilities, while in later years testing was done in rooms available in the individual schools or in mobile vans parked outside the schools. Each year, individual tests were grouped into two or more batteries, with each battery usually administered in a single session. Each battery included measures representing the range of areas being assessed; the order of tests within batteries reflected consideration for the need to balance types of responses (active vs. passive, verbal vs. nonverbal) and to stimulate and sustain the child's interest.

In the second year of the study, a variety of measures were used to assess the preschool experience of all children enrolled in Head Start or other preschool classes in the urban sites. Random time samples of individual children's behavior were collected throughout the year with PROSE, a structured observational procedure. Also, an attempt was made to obtain personal-social ratings of these children in the late fall and spring. Two trained local women observed each child's behavior during "free play," and later resolved any discrepancies in their independent ratings in order to form a single consensus rating on each scale. Global Classroom Ratings describing teacher-child and peer interactions were similarly obtained, except that observations for this instrument were not limited to "free play" periods. Global Classroom Ratings and teacher questionnaires were obtained in target classrooms for each subsequent year of the longitudinal study, with a target classroom defined as any class containing 50 percent or more study children. In grades 1-3 the observer who made the Global Classroom Ratings also provided information for the Assessment of Classroom Programs Inventory. Also, in grades 1-3, each teacher in a target classroom was asked to rate study children and their classmates with the Schaefer Classroom Behavior Inventory and the Enhancement of Learning Inventory. The local site coordinator explained the procedures and each teacher received a small honorarium for completing the tasks.

In the primary grades several group-administered measures were obtained. Group achievement tests were administered in the spring by the classroom teachers in target classrooms. The local coordinator explained the procedures for group testing and was available to assist the teachers as needed. Local ETS staff administered the Coopersmith Self-Esteem Inventory to all third-grade target classrooms to enhance the child's feeling of confidentiality in the information obtained. At the end of each school year, attendance, standardized test, and report card information were obtained from each school for study children.

Data processing

The data from all the above measures were scored and coded at the item level by Princeton office staff, and all scoring and coding was double-checked. The coded data were keypunched and independently verified, after which the individual data tapes were edited for appropriate ID listing and for out-of-range and logical inconsistencies in coding. To facilitate analysis across different measures and time periods, merge tapes for each study year were prepared that comprised all derived family and child scores from the separate task tapes. For a more detailed description of data collection and processing procedures, see Project Reports 72-18 (Shipman, 1972) and 75-28 (Shipman, McKee, & Bridgeman, 1976).

Results and conclusions

As might be expected, the case studies revealed the multiple determinants of academic success or failure; on first reading, each child's record appeared to have a unique history of causal antecedents. Among the many child, family, and school variables examined, no one score or composite of scores was consistently associated with level of academic achievement. When examining the extent to which children were categorized as exceptional according to geographical region, family structure, sex, and preschool attendance, only consistent differences according to site were evidenced, with more children from Lee County doing poorly and more children from Portland doing relatively well in reading and math. However, the extent to which site differences reflect differences in initial sam-

ple characteristics, geographical region, urbanness, preschool teacher certification, preschool program sponsor, and age of preschool entry (all of which are confounded with site in this sample) or other unmeasured relevant variables is unknown. Since most of these Head-Start-eligible children had actually attended Head Start, preschool experience *per se* did not differentiate high- and low scoring children; however, in checking those children who had been retained in first or second grade, a more severe index of poor school progress, a higher percentage of children who had not attended preschool was found. Moreover, for those Head Start children who later attended a Follow Through program, the data suggested the positive impact of continued broad services to the children and their families. When examining teacher background characteristics (that is, age, years of schooling, and amount of teaching experience), it was found that, at any one grade level, most teachers had children in both the high and low categories; gross school variables such as school size, class size, and percentage of minority students also revealed no consistent differences, although schools with more support staff tended to have more children in the high-achievement groups. Such findings point to the importance of investigating specific teacher-child interactions for understanding school effects.

Point-biserial correlations obtained between a selected group of family-status, situational, and process variables and the child's designation in high or low reading and math groups indicated that, even within this restricted sample of economically disadvantaged families, differences in parental educational level, physical resources in the home (that is, amount of material possessions, extent of physical crowding), and encouragement of school-relevant skills and attitudes (for example, frequency of reading to their 4-year-old child, level of educational aspirations and expectations) were associated with the child's later school progress. Similar findings were obtained by Greenberg and Davidson (1972) and Stedman and McKenzie (1971) in their research with high- and low-achieving low-socioeconomic-status urban northern Black and southwestern Mexican-American children, respectively. Low-income families are not a homogeneous group. The lack of association obtained between parental occupational status and children's academic achievement again highlighted previous reported study findings (Shipman et al., 1976) on the apparent different meaning of this variable for Black and White families.

Effect of early home influences

These data are consistent with the extensive research literature on the important relationship of early home influences and a young child's school performance (for example, Bronfenbrenner, 1974; Hanson, 1975; Hess, Shipman, Brophy, & Bear, 1969; White, Day, Freeman, Hantman, & Messenger, 1973). Although status, situational, and process variables may share considerable commonality in their prediction of the child's subsequent reading and math performance, the process variables help provide important explanatory information and programmatic clues that are not obvious from status characteristics alone. As was pointed out in a recent extensive discussion of relationships among family-status, situational, and process variables and children's academic achievement (Shipman et al., 1976), status characteristics may be viewed as providing differential opportunities for various processes to emerge. Thus, a higher level of parental education is associated with greater academic knowledge, increased awareness of public affairs and popular culture, more informed perceptions of school, and continued seeking of new knowledge, as in reading books and magazines (cf. Hyman, Wright, & Reed, 1975), all of which may have impact on a child's knowledge and motivation for learning. In addition, by providing differential opportunities for a parent's participation in society, there may be indirect effects upon the child via parental attitudes and child-rearing behaviors acquired through such experiences. Another example of the interrelatedness of status, situational, and process variables is the commonly found association between low economic status, high household density, and parental use of physical punishment with their children. The negative effects of crowding have been shown to be exacerbated by additional stresses in the home (Booth & Edwards, 1976). Family process variables are thus considered as the underlying mechanisms by which child outcome differences associated with family-status characteristics are created and maintained.

A variety of measures of children's functioning at age 4 were found to be useful in identifying children likely to do well or poorly during the course of their acquisition of the basic school skills of reading and math. Such measures were not limited to those in the cognitive-perceptual area, but included tasks assessing affective behaviors (that is, self-esteem, cooperation) and cognitive styles (that

is, reflectivity). These findings suggest that a number of preschool measures of children's cognitive, affective, and social functioning may indicate early strengths and weaknesses relevant to the children's later school functioning, perhaps in part due to their reflecting children's differential responsivity to early intervention. Further analyses of data collected at ages 5 and 6 are likely to suggest other important areas of inquiry, with some measures not found to be differentially predictive at age 4 becoming so at a later developmental stage. For example, preliminary analyses suggest that this is the case for the reflectivity-impulsivity dimension assessed with the Matching Familiar Figures Test and for academic achievement motivation that newly emerges during children's attendance in a preschool program. The positive use of such measures as initial screening instruments to provide guidance for tailoring programs to meet children's needs should be emphasized, as contrasted with their use in making placement decisions that may act as self-fulfilling prophecies. Preschool assessment can facilitate the provision of programs geared to the individual needs of children rather than those planned on the basis of their ascribed needs, according to various status characteristics.

But a major conclusion from these data is that these family and child variables are not necessarily associated with exceptionally high or low academic achievement; for any one of these variables, or a composite of home or child variables, much of the variance in individual scores remains unaccounted for. Also, the correlations do not provide rationales for the degree of association obtained. Thus, to obtain clues to the nature of moderating variables, it was decided to study intensively those children who showed the greatest absolute deviation in cognitive-perceptual performance, whether in a positive or negative direction, thereby taking into account potential interactions among family, child, and school variables and also differential sequences of school experiences.

Interaction between family, child, and school

The emerging causal hypotheses derived from this intensive case study approach may be grouped into three major categories of locus of change: the child, the home, and the school. Within each of these broad classifications, a number of subcategories can be derived. For example, change in a child's cognitive-perceptual performance can

be viewed as a function of change in the child's physical well-being (for example, a serious illness or accident leading to sensory impairment and/or absence from school, remediation of an interfering defect, or gradual "catch up" with developmental lag arising from premature birth); emotional status (for example, becoming more or less shy and inhibited in responding to an unfamiliar adult in a testing situation or being more or less willing to attempt a response when the questions become more difficult); motivation (for example, changes in the child's valuing of school performance, in expectancies for success in performing school tasks, and in enjoyment in the school situation); and in general cognitive strategies (for example, changes in ability to attend, reflect upon, or differentiate). As the case studies clearly exemplified, however, rather than acting in any simplistic compartmentalization, these changes in a child's functioning should be viewed as dynamic interdependencies among physical, affective, social, and cognitive behaviors. For example, for some children, preschool attendance appeared to affect most their self-confidence and ease in relating to others; these changes in personal and social variables later enabled them to better attend and assimilate academic instruction. For others, acquisition of new preacademic skills in preschool appeared to be causally related to their increased social and affective competencies.

Nevertheless, except for one child for whom a serious accident did seem to account for the striking decrement in performance, the above postulated changes, evidenced in the case histories examined, could not be viewed as sufficient causes. Examination of other case histories reflected similar events but without the same consequences.

In examining responses to the three parent interviews obtained when the children were 4, 5, and 9 years of age, examples were provided for changes in family-status, situational, and process variables. Changes in status and situational variables included those in family structure, employment status, welfare status, material well-being, home ownership, crowding, mobility, and so on. Attitudinal and behavioral changes were noted also, reflecting changes in feelings of alienation, powerlessness, and optimism, in child-rearing practices and in participation in school-related activities. Again, no one area of change was unique for families of exceptional study children.

Similarly, examination of programmatic information gathered regarding the schools and classrooms children attended yielded no

striking contrast at any one grade level. But, when examining the data sequentially, a pattern did emerge for children in the exceptional positive deviation category; a cognitively stimulating atmosphere where the teacher was rated at least moderately warm had been present for at least several years. For example, what may have started as small increases in the child's knowledge of school-relevant information, confidence, task orientation, and achievement motivation in a Head Start preschool program was apparently reinforced and enhanced by teachers in kindergarten and later primary grades. Most of these children (in contrast to many others in the study sample) never had teachers who were described as unenthusiastic, unprepared, using primarily negative reinforcement techniques, or providing little cognitive stimulation.

Continuing warm, stimulating environment

The most common picture that emerged for those children who showed the most gain in academic achievement was the previously mentioned continuing warm and stimulating classroom environment combined with a home environment that provided the child emotional support in general and support for school activities in particular. Examples of parental school-supportive activities included visiting the school, participating in classroom activities, knowledge of the child's functioning in school, higher expectations for the child's educational attainment, and, in some cases, the parents' involvement in their own continuing education.

It must be emphasized that, for these deviation cases, the above examples of supportive activities emerged following the initial parent interview. In some cases they reflected changes in parental behavior as a function of the preschool program the child attended. For example, in one family, the mother began by visiting her child's preschool program, later became a volunteer classroom aide, and by the time the child was in third grade had returned to school for a GED high-school equivalency certificate and was enrolled in a local community college. Both parent and child showed parallel educational growth. But it appeared obvious that the home did not impact on the child's progress in a sole or independent fashion. The child's preschool and grade school experiences were directly facilitating not only to him but to his mother, and thereby also acted indirectly on the child. The mother obtained information and emotional support

in the school setting. In response to greater acceptance, she participated more, and from such participation appeared to develop an increased sense of efficacy and optimism with greater awareness and use of community resources to meet family needs.

Another example of parallel child and family growth is seen in the following case. During the first two years, Mary (fictitious name) was generally moody, restless, and uncooperative in the testing sessions, both with her mother and the testers. She appeared quite timid and shy with strangers. Her mother, estranged from her husband, and living on welfare, also appeared somewhat aloof and negative. She reported having no friends or relatives and rarely going out. Mary attended a summer Head Start program prior to kindergarten, subsequent to which she appeared less shy and socially immature. She also performed better on the Year 3 measures. Classroom observations indicated that she attended a highly motivating, stimulating first grade. Her teacher provided considerable feedback and intellectual stimulation, often using unplanned incidents that occurred. Students appeared happy and involved and the teacher individualized the curriculum to a great extent. Mary prospered in this environment and her teacher described her as a mature, responsible, and excellent student. Mary's attitude toward herself and school improved considerably, and she did well on the various measures we administered that year. She continued to have a warm, individualized, and stimulating classroom in second and third grades. Mary's school records got progressively better, both academically and emotionally; she was described as having matured socially, as being a responsible, well-liked classmate, and as exhibiting a very high level of persistence in her schoolwork. Meanwhile, her mother appeared considerably less alienated, held high aspirations for her child's educational attainment, and had enrolled in a community college. Mary, a shy, uncooperative 4-year-old, was at age 9, a confident, happy child enjoying school and performing well.

Another child, the youngest of 15 children, was very nervous and shy during initial testing. Not used to being required to do things on his own, he refused several tasks and cried often. The next year he attended Head Start. According to his mother, Head Start "changed him in every way," but especially in helping him learn to play with other children and become more independent. When seen again at the testing center, he was no longer reserved and shy. In addition to these increased social skills, his test performance showed that he had

gained much from the cognitive stimulation of the preschool program and also from his daily viewing of "Sesame Street." Moreover, his parents continued to provide a very warm, affectionate home environment. Both parents were highly supportive of school activities; they read to their son often and had high educational aspirations for him. Despite the many children in the family, the mother's interview responses reflected a very differentiated and realistic appraisal of her child's strengths and weaknesses. In kindergarten he was described as having made very good classroom social and emotional adjustment and was a happy, independent, and able learner. His first-grade classroom appeared generally unstimulating, but the children were attentive and studious and the teacher tried to individualize the curriculum in a generally open, permissive environment. In contrast to Head Start he reported liking school "only a little bit." His performance in school and on our test batteries, however, remained above average. Fortunately, his classroom experiences were much more positive thereafter. His third-grade class, organized for team teaching, was a particularly happy, orderly, and stimulating environment. The teachers were affectionate and spent much of their teaching time with individual children. Again, home and school together provided a nurturing and supportive environment for the child's growth.

Tragedy of failure to interact

Just as the above cases exemplify the realization of the child's potential for growth when home and school work together to provide an emotionally supportive and cognitively stimulating environment, the next example indicates the tragedy that evolves when home and school not only fail to interact, but when there is a lack of communication and coordination among adults representing various social agencies purported to serve the child. When first seen at the testing center, John (fictitious name) was outgoing, friendly, and verbal, responding well to the variety of tasks in the four-day battery. He lived with his mother and two older sisters in a small crowded apartment with few conveniences or possessions of his own. During the mother-child interaction sessions, he showed considerable initiative in responding and was highly task-oriented and attentive. His mother was affectionate and provided him with frequent positive feedback and praise. Although she was somewhat limited in presenting

task-relevant information, the child learned the task quickly and well. When seen the following year at age 4½, John continued to perform well on the many diverse tasks administered, and testers consistently described him as an attentive, friendly, verbal boy with whom they enjoyed working. He attended a Head Start program and was described by his teacher as socially mature, creative, and quick to learn. His kindergarten teacher gave a similar appraisal, although she noted he seemed somewhat bored. His individual testing that year continued to indicate above-average cognitive and social competencies. When interviewed in first grade, he expressed strong liking for school, especially reading. The teacher rated him as very task-oriented, friendly, and nonaggressive. However, he changed from public to private school in first grade and, when he transferred back to public school in second grade, he began to show increasing absenteeism. His test performance, however, continued to be adequate. That year his teacher rated him as only somewhat attentive in school. In third grade he continued to perform well on individual tests, but, when interviewed again about school, he expressed considerable dislike, especially for reading. His teacher described him as not at all attentive in his school work and not friendly with his classmates. On the group achievement tests, he scored significantly below the mean performance level for other Black Head-Start-eligible study children. During the home interview, the mother repeatedly expressed concern about her son. She reported that within the past two years he complained increasingly of stomachaches, necessitating increasing absence from school. He finally had to be hospitalized and was tentatively diagnosed as having a stomach ulcer. The mother felt that her son's problems were due to emotional upset over not having a father. Although badly wanting to help her son, she didn't know what to do. There was no indication of communication between home and school, no sharing of information, no provision of resources. Teachers at different grade levels apparently were not questioning the discrepancies in teacher ratings and attempting to understand and counteract their cause. Nor was the physician who treated this child consulting with his teachers or obtaining counseling help for him or his mother. Yet without such communication, such combining of knowledge and resources, how likely is this child, particularly one who is economically disadvantaged and of minority status, to reverse his downward achievement trend? Instead, a horrendous cycle of absenteeism, lit-

tle if any academic progress, negative reinforcement, reduced academic motivation and interest, and increasing anxiety and negative self-evaluation has been set in motion.

In other cases, early gains gradually or abruptly disappeared in the absence of home and/or school support. One 4-year-old study child lived with her parents and four siblings in a bare two-room apartment with no toys, books, or TV. A grandmother babysat when the mother went to work. At age 5, this child attended Head Start. The teacher was affectionate, enthusiastic, and stimulating and worked with the children in various size groupings to match individual needs and preferences. Angela (fictitious name) was happy with newly discovered toys and materials and improved in her test performance. There was continuity of enthusiasm, affection, and stimulation in Angela's first-grade classroom, and she received special reading instruction to continue the progress she made in preschool. At the end of the year, it was recommended that she not continue with the special instruction. Her teacher noted that Angela was "definitely capable of reading but needed constant encouragement." Unfortunately, she did not receive the attention and encouragement she needed. Subsequent classroom observations in third grade revealed that the teacher offered no stimulation of thinking and displayed no affection or enthusiasm; efforts at individualization were rare. The home interview revealed no parental encouragement or stimulation of intellectual activities and little knowledge of their daughter or her progress. This case and many others clearly indicate the need for working with the total ecology of the child if we truly care and wish to serve our nation's children well.

Before concluding this description of study findings, it must be pointed out that there were cases where examination of the many accumulated bits of information provided no apparent clues as to causal factors for exceptional academic gain or loss. Some children appeared to have everything working against them, an exceedingly impoverished, continually stressful, nonsupportive home environment and a sequence of unexceptional classroom settings, but they still evidenced strong academic skills in third grade. Of course, the consequences of these negative factors may appear later. One such child has begun to express increasingly negative statements about himself and his family, negative feelings that, if continued, may increasingly interfere with other areas of functioning. However, it is also clear that, despite the extensive and in-depth assessment pro-

vided in the present study, we have only begun to tap the surface of the crucial dynamic factors in the child and his or her environment that affect performance in the school setting.

Significant generalizations

Some significant generalizations emerged from the intensive longitudinal examination of these exceptional study children.

1. Any particular aspect of individual functioning must be evaluated in the context of other aspects of the developing organism and the environmental conditions in which the organism is behaving. For example, development of affective and intellective behaviors were found to be closely intertwined, and knowledge of behaviors in one domain aided interpretation in the other, whether for understanding responses to the tester or to teachers and peers in the classroom. Similarly, intellectual and motivational correlates of variation in the child's health and physical status were evidenced.
2. Furthermore, the implications of many variables become understandable only after examining the variables and their interactions developmentally. This suggests a theoretical approach that considers developmental changes, in both the child and the environments in which that development is embedded, and more extensive use of longitudinal designs. It also implies that providing exceptional children, such as those in the present sample, with appropriate learning environments requires a historical perspective that a cutoff score does not suggest.
3. Not only do home and school variables, particularly parent-child and teacher-child interactions, influence a child's behavior, but most such effects are reciprocal and not unidirectional (for example, the case history of "John").
4. Interactions of individuals and the environments in which they function are dynamic; predictability of a child's achievement from early indices of the home environment should not be interpreted to mean that these predictors necessarily determine the child's achievement. Families, children, and schools can and do change, with corresponding changes in the nature of their interactions, and such change can be facilitative or harmful. In con-

trast to some interpretations of early childhood research findings, for example, White and Watts (1973), the age period 3-6 is not just a period of refining established relations.

5. In many cases, developmental progress was gradual across the time intervals in which measures were administered. In addition, growth in one domain often served as a precursor to growth in another; thus, development in one area may proceed in seemingly irregular spurts and be inappropriately assessed by traditional linear analytic methods. We need to develop greater sensitivity to measurement and interpretation of such changes and their cumulative effects so that we can enhance positive growth and counteract possible negative influences. These considerations also suggest the importance of long-term evaluation of intervention efforts. It may take several years of small cumulative gains before such gains are large enough to be statistically significant, which may account in part for some of the "sleeper" effects recently reported for upper-elementary grade low-socioeconomic-status children who had experienced early intervention programs (Palmer, 1976; Seitz, Apfel, & Efron, 1976).

6. As a corollary, facilitating influences usually require continuing reinforcement to maintain their positive effects. For example, most youngsters in Head Start evidenced increases in preacademic skills, task orientation, achievement motivation, and social skills in relating to their peers and to other adults. The academic gains generally were not maintained, however, when the grade-school program apparently did not capitalize on children's acquired skills and motivation. The finding by Coleman and his colleagues (1966) that disadvantaged children are more affected by the quality of teaching may be more crucial as children's sensitivity to their school experience is heightened by programs such as Head Start. For those children who showed the greatest gain in academic skills between ages 4 and 9, following Head Start attendance, there was a continuity of facilitating school experiences; at each primary-grade level these children had enthusiastic, warm, positively motivating, cognitively stimulating teachers who taught in a one-to-one or small-group setting. Such continuity in facilitating school experiences is particularly nonexistent for a sizable minority of low-income children who move frequently between schools, a situation common to many urban

areas. Moreover, this continuing warm and stimulating school environment was combined with a home environment that provided the child emotional support in general and support for school activities in particular.

7. Finally, in reviewing the information gathered, one becomes acutely aware of the multiplicity of positive and negative factors for the children in these extreme achievement categories. Thus, it is not a particular parent, teacher, or child attitude, attribute, or behavior, or a particular social setting, but the cumulative effects of their multiple interactions. Moreover, for different children, different clusters of variables appear to be differentially effective, suggesting the need for multidimensional assessment of individuals and their environments.

Hypotheses for further study

The present case study approach has generated a number of hypotheses that should be investigated further in the larger study sample. In future analyses, particular attention will be paid to investigating the complementarity of home and school influences, differential effects for congruent and noncongruent instructional sequences in relation to child characteristics, and the nature of the complex interactions among affective, social, cognitive, and perceptual development. Subsequent analyses might examine whether home and school influences operate in an additive or interactive fashion in their impact upon a child's educational progress. Also, there is need for more precise delineation of the meaning of continuity of experiences. To continue to meet a child's developmental needs, continuity may necessitate change, not continuation, of experience. Again, a "building block" notion of dynamic transactions (cf. Sameroff, 1975) appears to provide a more adequate conceptualization of what occurs in these environmental interactions. Also, further efforts to delineate the most predictive composite at each age within socioeconomic status, sex, and race subgroups for those measures administered during the first four study years should provide guidance to current efforts at early screening and identification of children with potential learning disabilities. There is also considerable need for more research aimed at understanding those children who show outstanding resilience amid considerable environmental stress. When examining these case histories, one cannot help but be im-

pressed by the strengths one perceives in the children and in their families. Most studies in the literature, however, have focused on pathology; our understanding of such strengths is meager at best.

As case histories in this study indicate, low socioeconomic status and minority group membership do not necessarily imply low school achievement. The children showed a wide range of aptitudes and abilities. Moreover, parents and teachers do make a difference. Thus, findings of this study are supportive of the importance of early parent-child interactions as well as the child's early acquisition of school-relevant skills and motivation and programs such as Head Start that emphasize the parents' involvement in the child's educational experience. In describing the interrelatedness of family status, situational, and process variables, the data also suggest the potential positive impact of economic aid to impoverished families in raising competence levels in the children (that is, even small differences in material possessions and household density were associated with children's higher achievement) and the necessity for coordination of services to support the children and their families. These findings, and the several case histories described, are consistent with projects recently reviewed by Meier (1976) in suggesting that cognitive gains are likely to be largest and to be sustained when there is support in the total ecology of the child, not just in the quality of parent-child interactions alone, but also in adequate health care, nutrition, housing, and general family support. They also support his proposal for neighborhood family development centers to coordinate comprehensive service, training, and research functions as a basis for modifying the total ecology of the developing child.

The data also indicated the potency of classroom interactions on the child's progress. Similarly, in his recent book, Bloom (1976) challenges the schools to provide all children with appropriate learning opportunities and describes a mastery approach that had promising results with older students. The importance of the complementarity among socializing influences, however, was evident in the present sample. Parent-to-child or teacher-to-child models appear too simplistic for characterization of minority children's achievement behaviors. Sustained intellectual growth depends on the quality of relationships established between parent, teacher, and child. More research and development activities are needed that focus on elaborating the mechanisms by which home and school can work more effectively together to enhance a child's development.

The children in the present sample would be considered by most as "children at risk," but, in following six years in their lives, we see no inevitable sequence of events that could not have been otherwise determined. The case studies that exemplified the nurturance and acceleration of competencies during the six-year span of the study speak out against those who accept the inevitability of increasing despair and failure for low-income minority children in school. Our responsibility is to create situations where such children are typical, not exceptional. These children had families able to provide love, concern, and support for their school activities, teachers who provided them with the necessary encouragement, stimulation, and reinforcement for learning in a manner responsive to their particular learning styles, and they were not beset by physical or other problems interfering with their ability to respond adequately and progress. We must coordinate our nation's resources to assure that no child receives less. It is hoped that this study provides some clues to the theoretical considerations and applied strategies that will contribute to that undertaking.

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